Merced Irrigation District,
Edendale Creek Turnout and Weir
Hopeton Vicinity
Merced County
California

HAER No. CA-192-A

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Department of the Interior
San Francisco, California

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HISTORIC AMERICAN ENGINEERING RECORD
MERCED IRRIGATION DISTRICT,
EDENDALE CREEK TURNOUT AND WEIR

HAER No. CA-192-A

Location:	Hopeton Vicinity Merced County, California USGS Yosemite Lake Quadrangle, 7.5' (1962, Photorevised 1987) UTM Coordinates: Zone 10, 4145660 N, 721920 E
Date(s) of Construction:	1885; modified circa 1910-11, 1959, 1993, 1997
Builder:	Merced Canal and Irrigation Company
Present Owner(s):	Merced Irrigation District
Present Occupant(s):	Merced Irrigation District
Present Use:	Water turnout for Edendale Creek from Main Canal
Significance:	The Edendale Creek turnout and weir are locally important as original features of the Merced Irrigation District's Main Canal. The canal played a vital role in the economic and social development of Merced County from 1885 until 1941.
Report Prepared by:	Cindy L. Baker, Historian PAR Environmental Services, Inc. 1906 21st Street Sacramento, CA 95816
Date:	January 1998

I. DESCRIPTION

The Edendale Creek Turnout Structure is a reinforced concrete structure of 25.5 feet in length and 24 feet in width with a concrete weir (CA-192-A-1) approximately 134 feet downstream. The present turnout reflects several modifications made since it was constructed in 1885. The most significant modifications involved reconstruction of the original wooden bulkhead with concrete (around 1910-1911), the addition of a concrete roadbed over the structure (1959) and replacement of the original wooden gates (1993). The gate activators were replaced with salvaged cast iron activators in 1997. The original plan and construction methods are not certain. However the turnout modifications dating from 1910, as well as subsequent modifications, are detailed in Section II.

Two concrete gauging wells are located downstream approximately 120 feet from the structure. A concrete sharp-crested weir was constructed another 14 feet downstream. This document treats these features as auxiliary components of the turnout.

On-site examination of the turnout, an analysis of engineering drawings and reports, and archival research indicate that the historical integrity of the original 1885 structure does not remain intact. The timber bulkheads were replaced with concrete in 1910-1911. The original wooden decking was replaced with a concrete cap roadbed in 1959. The original wooden gates and gate structure were replaced with steel gates and iron I-beams in 1993. The gear housings were replaced with modern housings in 1997. Virtually nothing remains of the original timber construction.

II. ARCHITECTURAL AND ENGINEERING INFORMATION

Turnout Structure

The Merced Canal and Irrigation Company constructed the Edendale Turnout structure in 1885. The structure was part of an extensive system of canals and tunnels and was one of numerous turnouts allowing releases from the main canal, appropriately known as the Main Canal (see Figure 1, Page 9). Work on the system began in 1883. The canal crossed Edendale Creek in 1884-1885 (see Figure 2, Page 10). A turnout would have been needed to allow continued flow into the creek and prevent flooding from damaging the canal. At the time it was constructed, the turnout at Edendale Creek was a minor feature of the system and was not noted in contemporary maps and reports.

The original turnout probably consisted of four gates held in place by timber bulkhead. This original structure was apparently replaced with reinforced poured-in-place concrete (CA-192-A-3) in 1910-1911 (Abrahamsen 1997; Dockweiler 1913). This concrete bulkhead acted as a gate in the levee embankment along the Main Canal (CA-192-A-6). Two one-foot-thick concrete walls extended from the gate structure approximately 15 feet into the Main Canal and then downstream from the gates about 19 feet, preventing erosion along both sides of the embankment. A concrete apron prevented erosion beneath the structure. These walls were

stepped at the top and each was capped with a 4-foot-wide and 7.5-inch-thick concrete slab. Two wing walls flanked the downstream opening of the turnout. These walls were 5.5 feet in height and were imbedded into the bank.

Between the two exterior walls, three 10-inch-thick poured-in-place concrete piers with beveled leading edges held the gates in place. The piers were 4 feet, 7 inches apart on center. The center pier maintained a height of 11 feet for 11 feet downstream from the gates, while the two walls around it were 11 feet tall for approximately four or five feet from the gates then dropped at a 45 degree angle to the concrete floor of the structure. This configuration remains intact today.

The original wooden gates were four feet in width and of unknown height, although their modern steel replacements are 5 feet 8 inches tall. The wooden gates were held in place in channels formed in the concrete walls during the construction of the concrete bulkheads in 1910-1911. The modern steel gates travel in steel brackets cemented to the walls along the old channels. The walls were 3 feet 9 inches apart. Each gate was operated independently. The gate was raised or lowered using a gear that turned the gate stem. This configuration remains intact today.

There is a 2-foot 3-inch-wide catwalk (CA-192-A-5) attached to the upstream side of the turnout. The catwalk is 19 feet, 7 inches long and protected with a hand railing made of 2-inch-diameter pipe. The catwalk does not appear to date to the original construction date of 1885.

Two stilling wells were constructed approximately 136 feet downstream from the gates. They were both 2.5 feet in diameter vertical cylindrical concrete structures. The one nearest the streambed still contains a measuring scale. It was formed with an inner lip to hold a cover in place around the mouth of the structure. The other well, higher up the bank is much deeper and probably used to measure the creek in flood stage. It does not have a measuring scale. It was formed with an outer lip to hold a lid that would fit inside the concrete structure.

Approximately 14 feet downstream of the wells and 150 feet downstream from the gates, a sharply-crested concrete aggregate weir slows the flow into Edendale Creek (CA-192-A-8, CA-192-A-9, CA-192-A-10). Concrete walls (CA-192-A-2), 10 inches thick, were attached to the top of the weir and extended into the bank to channel the flow and prevent erosion. This structure was probably built around 1910-1911, as wall thickness and construction techniques are identical to the concrete turnout bulkhead.

1959 Modifications

In 1959, the Merced Irrigation District constructed a concrete deck on the structure to create a roadbed (CA-192-A-4). The center pier was extended another eight feet in length to support an 8.5-inch-tall concrete cap. A 9-inch-tall concrete curb was formed on the downstream side of the new roadbed (MID 1959).

1993-97 Modifications

In 1993, the Merced Irrigation District replaced the original gates with steel replacement gates. They were placed in tracks cemented to the original piers. In 1997, the earlier pedestal base-type activators (or actuators) were replaced with cast-iron salvaged gear housings with plastic pipe extending upward to serve as gate stem protectors (Abrahamsen 1997) (CA-192-A-7). A new structure made of welded salvaged I-beam was bolted to the original concrete walls and piers (MID 1995). The five vertical members are 9 inches by 9.5 inches wide and 38 inches tall on the upstream elevation. The three central members are bolted to the original piers and are capped with and welded to horizontal 6-inch by 2-inch beams. The activators sit on top of the horizontal beams.

III. HISTORICAL INFORMATION

Mereed Irrigation District History

lnitial irrigation efforts using water from the Merced River began around 1851 along the river bottom lands (Outcalt 1925:333). Small embankments, constructed at low spots along the river as flood prevention methods, protected farmland but also created a need for irrigation. Small farm ditches, used to cultivate alfalfa, com, field vegetables, garden produce and fruit, extended from the river to the bottom lands in the 1860s (Elliott and Moore 1881:170). While the land was convenient to irrigate, it was also recognized that the eastern Merced County plains contained fertile soil only lacking an adequate water supply.

William G. Collier envisioned the first large-scale plan for an irrigation system in 1870. Collier and two partners incorporated the Robla Canal Company in 1870 and built seven miles of ditches and a 1,580-foot-long tunnel to bring water from the Merced River to Canal Creek. From the creek, water was diverted to farm ditches until the creek emptied into the San Joaquin River (McSwain 1978:1; Outcalt 1925:335; Radcliffe 1940:177).

The Farmers Canal Company, incorporated in 1873, bought out the Robla Canal Company in 1876. Their new system extended across Bear Creek, Mariposa Creek, and the Chowchilla River for about 50 miles including a diversion at Canal Creek and lateral branches and ditches off the main system. As a result, it irrigated a vast region of agricultural land (Elliott and Moore 1881:179-180; Outcalt 1925:336; Radcliffe 1940:177).

Charles Crocker and C. H. Huffman purchased the Farmers Canal Company in 1882 at a $100,000 loss to the latter company. Crocker and Huffman organized the Merced Canal and Irrigation Company (MCl) to operate the system. In 1883, they set about widening the old Robla Canal. In 1884, they built an additional five miles of the Main Canal heading southwest from Canal Creek. The Edendale tumout was likely constructed during this phase as the Main Canal crossed Edendale Creek. In 1885, a second 1,996-foot-long, timber-lined tunnel was started. By 1886, the Main Canal had been completed to the Lake Yosemite reservoir site, which began to

fill on February 1, 1888 (see Figures 1 and 2, Pages 9 and 10) (Abrahamsen 1997; Lewis Publishing Company 1892:79; McSwain 1978:4-7; Outcalt 1925:335, 337; Radcliffe 1940:179).

In 1888, Crocker and Huffman incorporated the Crocker-Huffman Land and Water Company, which immediately ceded its holdings to the Merced Canal and Irrigation Company. Huffman, who owned considerable acreage within reach of the canal system, organized and led development and colonization in the area, resulting in an economic boom in Merced County. In addition to land sales and irrigation water, the Crocker-Huffman Company also provided a domestic water supply to the City of Merced. This conduit was used from 1889 until 1917, when the City switched to wells and pumps for their daily water needs (McSwain 1978:9; Outcalt 1925:337; Radcliffe 1940:179).

The Crocker-Huffman Company continued in operation with little change to the system other than routine maintenance into the twentieth century. By 1910, the company was preparing for sale of the system. Part of their preparation included replacing deteriorating timber bulkheads on the Main Canal with concrete structures. In 1912 they hired J. H. Dockweiler, a consulting engineer from San Francisco, to prepare an appraisal of the physical works of the irrigation system. His 1913 report placed the value at $1,297,970.96 and contained engineering drawings, photographs, cost estimates, and detailed plans of typical headgates, side gates, bridges and other features along the canal (Dockweiler 1913:583; McSwain 1978:15).

While the Edendale turnout was not specifically described, a photograph of a "Typical Flood Gate" depicts concrete abutments almost identical to those at the Edendale turnout. Dockweiler also included plans of the Fahrens Creek Flood Gates (see Figure 3, Page 11) and noted that it was, "typical of renewals in 1910 and 1911 of old structures on Canal 1A [Main Canal] when timber bulkheads were replaced with concrete." This would seem to indicate a high probability that the Edendale Creek Turnout was replaced with concrete at the same time (Dockweiler 1913:583).

The Merced Irrigation District (MID) was formed on December 8, 1919, in order to form a district capable of buying out Crocker and Huffman. The MID purchased the system, consisting of the canals, laterals, diversion dam, Lake Yosemite reservoir, and the company's water rights, for $2,250,000 on January 18, 1922. This transfer included the Edendale Creek right-of-way. MID immediately set to work making repairs and modifications to the system (Abrahamsen 1997; McSwain 1978:18-19, 224; Outcalt 1925:343, 345).

Improvements continued for decades after MID's acquisition of the system. MID typically advertised for bids for these jobs in the local newspaper. If they received no bids, they did the work themselves. Periodic reports of MID to its Board of Directors list significant contracts awarded for these projects. However the Edendale turnout improvements would likely have been listed under the commonly used heading of "small diversions" and were not mentioned by name (MID 1922, 1927: np).

Replacement of original timber structures with concrete continued until the early 1940s. In 1939, MID awarded a contract to Lloyd Terrell of Turlock to replace the original timber headgate on the Main Canal with a new concrete structure. In 1941, MID again hired Terrell to rebuild a combination floodgate and headgate at Fahrens Creek on the Main Canal. Other improvements were put on hold until after World War II in 1946 (Abrahamsen 1997; McSwain 1978:143, 149).

Although efforts to expand the system included construction of new canals and a dam, MID did not alter the Main Canal or its lateral ditches. Over the next several decades, routine maintenance was completed on the system, but little alteration occurred (McSwain 1978:62). MID, the County, and local landowners that maintain the bridges have slowly been replacing the original wooden bridges with concrete structures. A letter dated March 18, 1980, for example, addressed the construction of a new concrete bridge at the Robinson Ranch location that year (Leachman 1980).

Even with the above changes, the canal retains its historic appearance today. The majority of the banks are earthen, although about one-third have been lined with concrete through the years. Four wooden bridges remain in place, as do the Canal Creek headgates. The Main Canal headgates were constructed in 1939 to 1940 and have not been changed, other than through conversion to a remote-controlled operation.

Community History

The Edendale Creek Turnout is significant to local history for its contribution to economic and social development as an integral part of the original Merced Canal and Irrigation Company's Main Canal. This company contributed greatly to the development of agriculture in the region and to the ultimate creation of a number of small farm-based residential subdivisions.

IV. PROJECT INFORMATION

This documentation has been prepared at the request of MID, which is proposing to enlarge the existing Edendale Creek Turnout and replace the downstream weir. Three additional concrete bays will be constructed upstream on the Main Canal adjacent to the original four bays, which will remain in place. The channel downstream will be modified by excavating a 38-foot-wide and 120-foot length channel with an 18-inch layer of riprap over the cut slopes. A new reinforced concrete weir with wing walls will be constructed. Downstream, a new channel will be cut and lined with riprap.

The Project Manager and photographer for the recordation was David DeVries of Mesa Technical of Berkeley, California. Cindy L. Baker of PAR Environmental Services, Inc. was the Principal Investigator for the written documentation. The document is based on a previous

investigation conducted by PAR Environmental Services, Inc. reported in *National Register of Historic Places Significance Evaluation, Main Canal, Merced County, California* (1992).

V. SOURCES

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FIGURE NOT AVAILABLE
See field records for details

Figure 1. Project Vicinity Map

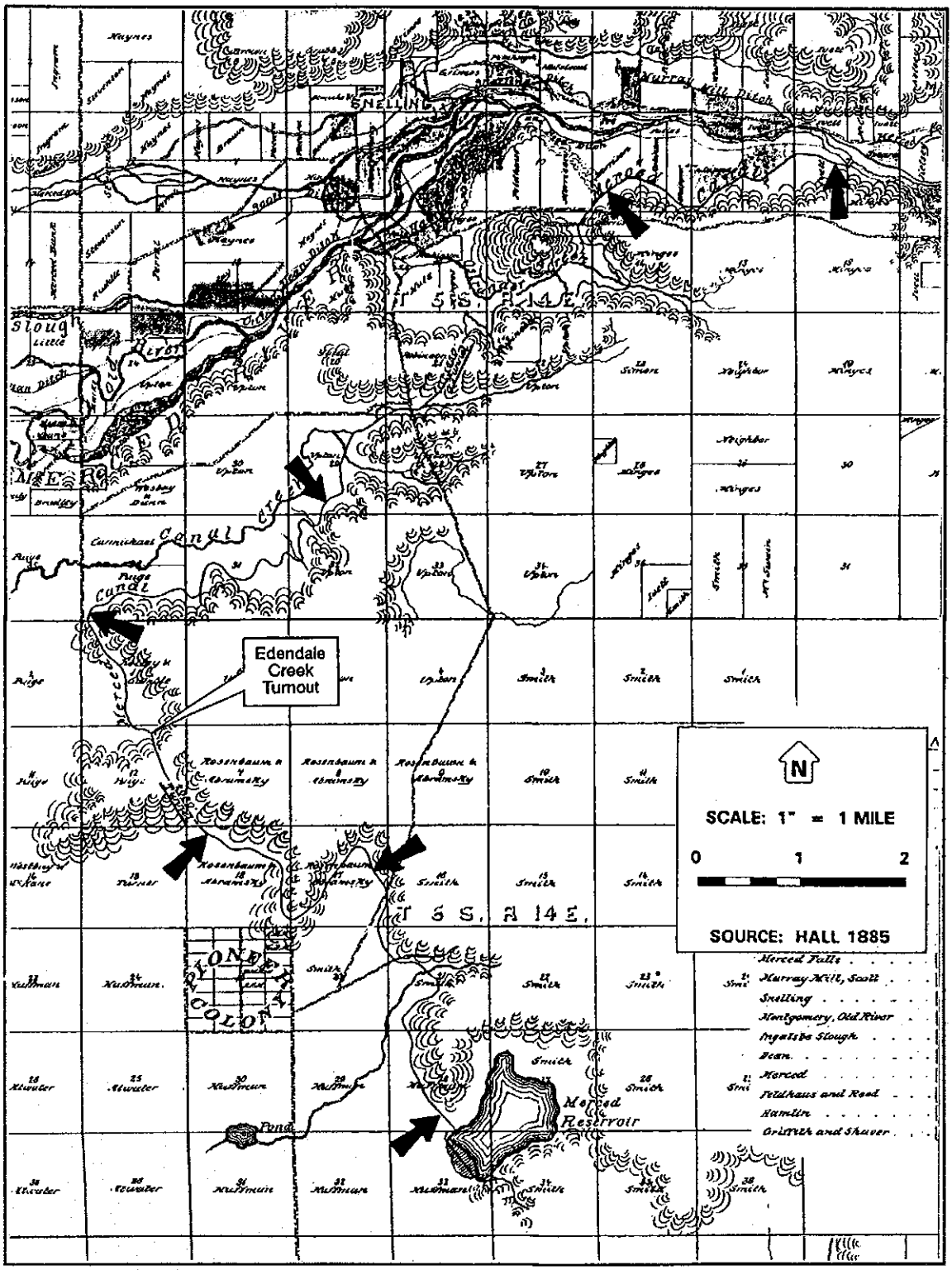

Figure 2. Official Map of Merced County, 1885, Depicting Main Canal Alignment

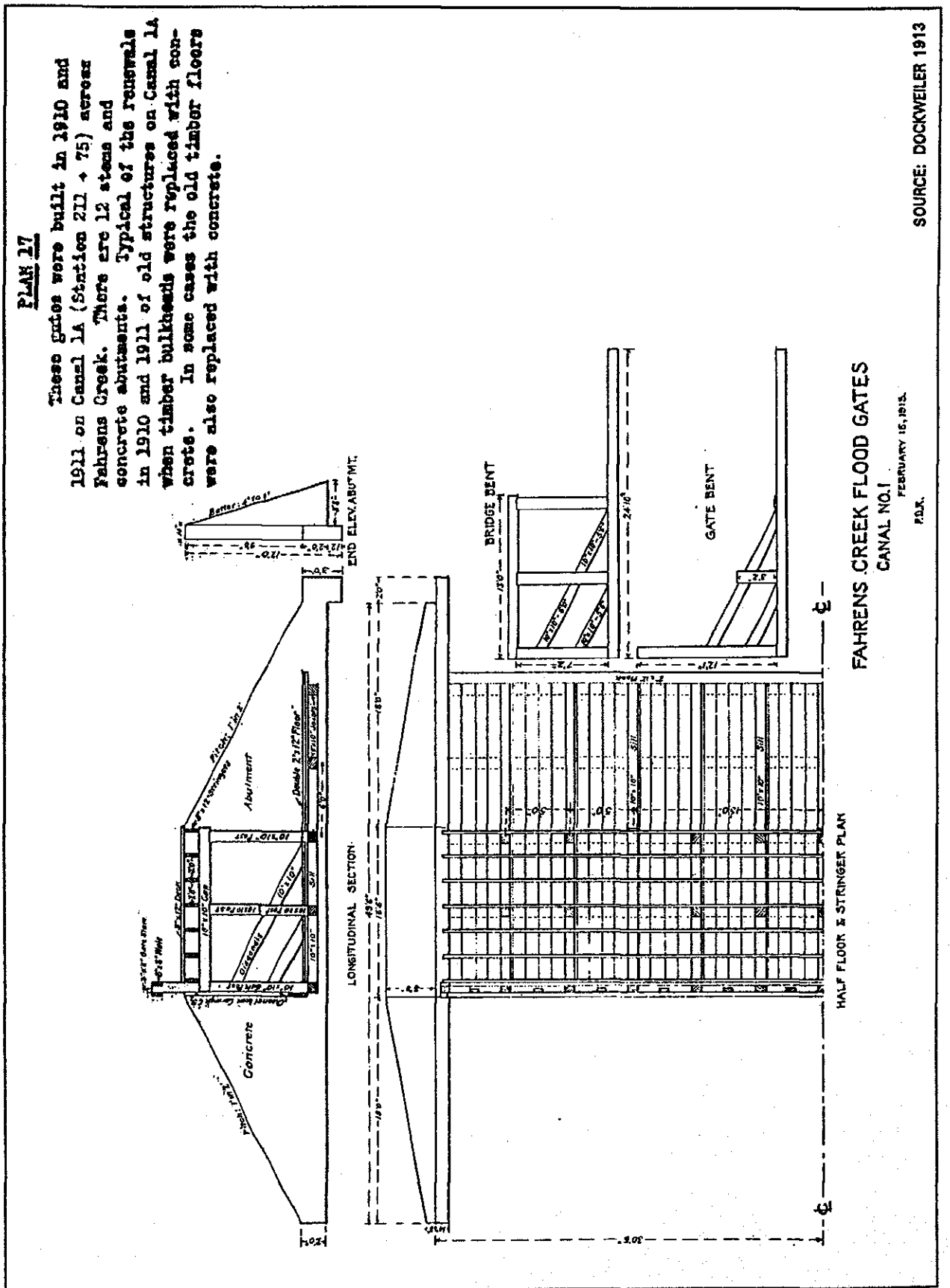

Figure 3. Plans for Timber Bulkhead Replacement for Concrete

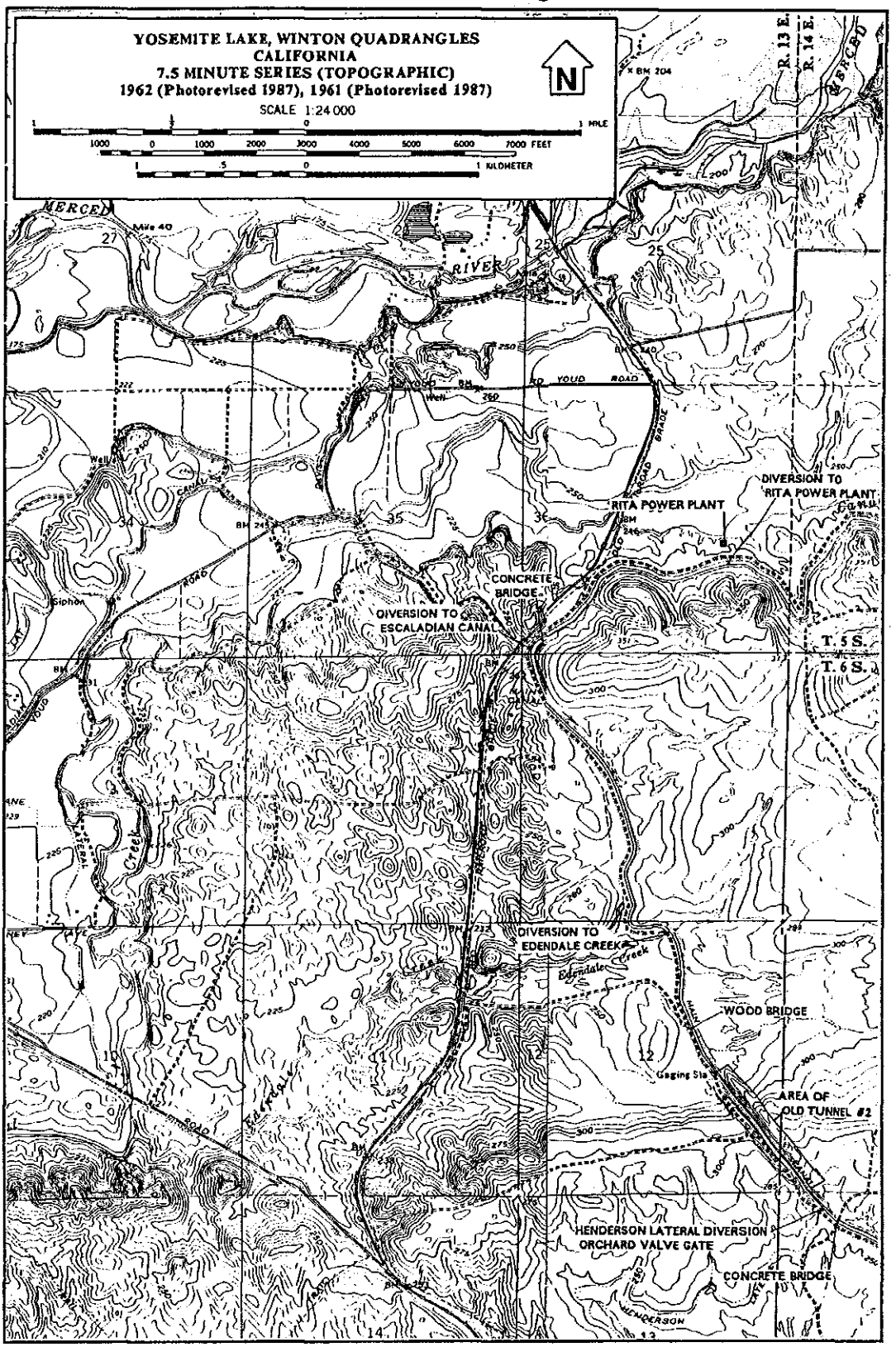

Figure 4. Site Map